

REMARKS

Applicant has amended claims 1 and 3. Applicant respectfully submits that these amendments to the claims are supported by the application as originally filed and do not contain any new matter. Accordingly, the Office Action will be discussed in terms of the claims as amended.

The Examiner has rejected claims 1 and 3-6 under 35 USC 103 as being obvious over JP 10-178124 in view of Williams et al., stating that JP '124 discloses in Figs. 1a and 1b a plastic gear having teeth 3 on an annular portion thereof, a shaft supporting member 2, a first annular rib 5 and first web portion 4 located between said rib and said teeth, but does not disclose said web portion is corrugated; Williams et al. teaches in Figs. 1 and 3 a plastic gear having a corrugated web portion; and it would have been obvious to one of ordinary skill in the art to modify JP '124 in view of the teachings of Williams et al.

In reply thereto, Applicant would like to point out that Applicant's invention is a plastic gear that is used in precision instruments such as printers, copy machines, etc. and such a gear has to have sufficient rigidity (less deformative by outer loads) and have accuracy in its toothed portion. Generally, in plastic gears, in order to increase the rigidity of the webs, a plurality of diametrical ribs that extend in a radial pattern are formed and a plurality of circumferential ribs are formed concentrically. These ribs are provided so as to reinforce the web and increase the rigidity. However, Applicant respectfully submits that with such ribs, the web that is formed with ribs is increased in thickness an amount which is equal to the thickness of the ribs. Such a requirement causes certain problems. In particular, when plastic gears are made by injection molding, the portion that has a rib suffers from a larger contraction deformation during the process in which the melted resins become solid, and as a result, deformation of the ribs occurs and the deformation is in a larger amount than if the rib was thin. Accordingly, when the rib is formed near the toothed portion, although the strength may increase, the accuracy or degree of precision of the toothed portion which is the most important element of the gear decreases and high-accuracy gears cannot be easily obtained.

In view of the above, Applicant's invention overcomes the disadvantages of the construction suggested by the prior art by increasing the rigidity of the plastic gear by providing the diametrical ribs and circumferential ribs in the areas that less influence the accuracy of the toothed portion and increases the rigidity and strength of the gear without decreasing the

accuracy of the teeth by providing the corrugated shape for the web in the area which would most influence the accuracy or precision of the teeth.

With the above in mind, Applicant has carefully reviewed JP '124 and respectfully submits that JP '124 discloses the usual prior art devices which are described above and which have the problems discussed above. Still further, Applicant respectfully submits that JP '124 does not suggest or show Applicant's solution and one of ordinary skill in the art would not be motivated by the teachings of JP '124 to create Applicant's invention. Moreover, Applicant has carefully reviewed Williams et al. and respectfully submits that Williams et al. teaches that the corrugated portion would extend from the shaft-supporting portion all the way out to the teeth and does not suggest the construction wherein the radially extending diametrical ribs would be provided between the shaft-supporting portion and a circumferential rib and then the web would be formed corrugated. Therefore, Applicant respectfully submits that Williams et al. would also not suggest to one of ordinary skill in the art or provide the motivation for one of ordinary skill in the art to create Applicant's invention by combining it with JP '124 in the manner suggested by the Examiner.

In view of the above, therefore, Applicant respectfully submits that not only is the combination suggested by the Examiner not Applicant's invention but also the combination suggested by the Examiner is not suggested by the art. Therefore, Applicant respectfully submits that claims 1 and 3-6 are not obvious over JP '124 in view of Williams et al.

The Examiner has rejected claim 2 under 35 USC 103 as being obvious over JP '124 in view of Williams et al. and further in view of Mlenjnek et al., stating that the combination of Williams et al. and JP '124 discloses all of Applicant's invention, but does not disclose that the plastic gear is used to drive an image forming device; Mlenjnek et al. teaches in Fig. 4 a laser printer drive train using a plastic gear 18; and it would have been obvious to one of ordinary skill in the art to modify the combination of JP '124 and Williams et al. in view of the teachings of Mlenjnek et al.

In reply thereto, Applicant would like to incorporate by reference his comments above concerning Applicant's invention, JP '124 and Williams et al. In addition, Applicant respectfully submits that Mlenjnek et al. merely shows a plastic gear and does not disclose radially extending diametrical ribs between the shaft-supporting portion and the circumferential rib and a corrugated web between the circumferential rib and the toothed portion.

In view of the above, therefore, Applicant respectfully submits that not only is the combination suggested by the Examiner not Applicant's invention but also the combination is not suggested by the art and one of ordinary skill in the art would not be motivated to make the combination suggested by the Examiner. Therefore, Applicant respectfully submits that claim 2 is not obvious over JP `124 in view of Williams et al. and further in view of Mlenjnek et al.

In view of the above, therefore, it is respectfully requested that this Amendment be entered, favorably considered and the case passed to issue.

Please charge any additional costs incurred by or in order to implement this Amendment or required by any requests for extensions of time to KODA & ANDROLIA DEPOSIT ACCOUNT NO. 11-1445.

Respectfully submitted,

KODA & ANDROLIA

By 

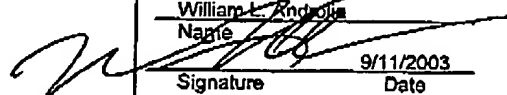
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